

Applicant : Kenneth C. Creta et al.
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Please amend the claims as follows (this listing replaces all prior listings):

1. (Currently amended) Apparatus comprising:
a cache memory comprising cache lines to store data, each of at least a subset of the cache lines having multiple portions, at least some of the data to be written to a main memory;
and
an eviction mechanism to evict data stored in one of the cache lines upon detecting validity bits indicating that respective portions of the cache line have been written with new write data that were not read from the main memory based on validity state information that indicates the status of the data stored in respective portions in the cache line, the eviction mechanism to send the evicted data to the main memory.
2. (Previously presented) The apparatus of claim 1 in which each of the cache lines is to store data that corresponds to consecutive addresses in the main memory.
3. (Cancelled)
4. (Previously presented) The apparatus of claim 1, further comprising a storage to store validity bits that track the validity of respective portions of the cache line.
5. (Original) The apparatus of claim 4 in which the validity bits are set to a predefined value to indicate that the respective portion has been written in full in one write transaction.
6. (Previously presented) The apparatus of claim 5 in which the eviction mechanism is to evict the cache line when the validity bits all have the predefined value.

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7. (Previously presented) The apparatus of claim 1 in which the eviction mechanism is to evict the data even if the cache is not full and data in other cache lines is not being evicted at the same time.

8. (Previously presented) The apparatus of claim 1, further comprising the main memory to store the data evicted by the eviction mechanism.

9. (Previously presented) The apparatus of claim 8 in which the data are generated by an input/output device and are stored in the cache memory before being written to the main memory.

10. (Currently amended) Apparatus comprising:
cache lines, each to store bytes of data that correspond to consecutive addresses in a main memory, at least some of the data to be written to the main memory, each of at least a subset of the cache lines having multiple portions, each portion corresponding to a validity bit that is set to a predefined value when the corresponding portion of the cache line is fully written with new data in one write transaction, the validity bit not being set to the predefined value if the corresponding portion of the cache line is not fully written with new data or if the corresponding portion of the cache line is fully written with new data in two or more write transactions; and
an eviction component to evict the bytes of data stored in one of the cache lines when validity bits corresponding to the multiple portions of a cache line are all set to the predefined value, the eviction component to send the evicted data to the main memory.

11. (Original) The apparatus of claim 10 in which cache lines are disposed within a write cache memory of a computer chipset.

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12. (Previously presented) The apparatus of claim 30 in which the cache coherent protocol comprises at least one of a modified-exclusive-invalid (MEI) protocol and modified-exclusive-shared-invalid (MESI) protocol.

13. (Currently amended) A method comprising:
receiving write transactions associated with write data to be written to a main memory;
storing the write data into portions of a single cache line of a cache memory, the cache line having multiples portions; and

evicting the write data from the cache line ~~when upon detecting validity bits indicating that respective portions of the cache line is full of have been written with new write data that were not read from the main memory according to stored validity information that indicates the status of the data stored in respective portions of the cache line.~~

14. (Previously presented) The method of claim 13, further comprising writing the evicted bytes of data to the main memory.

15. (Previously presented) The method of claim 13, further comprising setting validity bits to a predefined value when respective portions of the cache line is written in full with write data.

16. (Original) The method of claim 13 in which the write transactions are sent from an input/output device.

17. (Original) The method of claim 16 in which each of the write transactions sent from the input/output device writes a first number of data bytes to one of the cache lines, and the eviction component evicts a second number of data bytes in one eviction operation, the first number being less than the second number.

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18. (Currently amended) Apparatus comprising:
a computer chipset comprising a cache memory to store write data sent from an input/output device, the data being stored in the cache memory before being written to a main memory, and a mechanism to evict the write data from the cache memory when a set of predefined conditions are met.
19. (Currently amended) The apparatus of claim 18 in which the cache memory also stores additional write data sent from an additional input/output device, the additional data being stored in the cache memory before being written to the main memory, and the mechanism also to evict the additional write data from the cache memory when the set of predefined conditions are met.
20. (Previously presented) The apparatus of claim 33 in which the cache coherent protocol comprises at least one of a modified-exclusive-invalid (MEI) protocol and modified-exclusive-shared-invalid (MESI) protocol.
21. (Previously presented) The apparatus of claim 18 in which the input/output device initiates write transactions to send the write data, and the mechanism is to combine the write data so that the number of eviction operations performed to evict the write data from the cache memory is less than the number of write transactions initiated by the input/output device.
22. (Currently amended) A method comprising:
initiating write transactions by an input/output device to write data;
writing the data into a cache memory before the data is written to a main memory;
evicting the data from the cache memory; and
writing the data into the main memory.

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23. (Previously presented) The method of claim 22 in which the cache memory contains cache lines to store data, each cache line corresponding to consecutive addresses in the main memory.

24. (Original) The method of claim 23 in which each cache line has multiple portions, each portion corresponding to a validity bit that tracks the status of the corresponding portion.

25. (Original) The method of claim 24 in which the validity bit is set to a predetermined value responsive of the number of bytes of data written into the corresponding portion.

26. (Original) The method of claim 25 in which the evicting the data from the cache memory comprises evicting the data when the validity bits corresponding to a cache line are all set to a predefined value.

27. (Previously presented) The apparatus of claim 29 in which the cache coherent protocol comprises at least one of a modified-exclusive-invalid (MEI) protocol and modified-exclusive-shared-invalid (MESI) protocol.

28. (Previously presented) The method of claim 22 in which writing the data into the cache memory comprises writing the data into the cache memory complying with a cache coherent protocol.

29. (Previously presented) The apparatus of claim 1 in which the cache memory complies with a cache coherent protocol.

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30. (Previously presented) The apparatus of claim 10 in which the cache memory complies with a cache coherent protocol.

31. (Previously presented) The method of claim 13 in which the cache memory complies with a cache coherent protocol.

32. (Previously presented) The method of claim 13, further comprising reading a segment of data from the main memory if the write data to be written to the main memory do not correspond to a cache line address of the cache line, a portion of the segment of data having the same addresses as the data to be written to the main memory.

33. (Previously presented) The apparatus of claim 18 in which the cache memory complies with a cache coherent protocol.

34. (Previously presented) The method of claim 1 in which every cache line in the cache memory has multiple portions.

35. (New) An apparatus comprising:

a cache memory comprising cache lines to store data sent from an input device, the data being stored in the cache memory before being written to a main memory, each of at least a subset of the cache lines having multiple portions, each portion corresponding to a validity bit that is set to a predefined value when the corresponding portion of the cache line is fully written with new data in one write transaction, the validity bit not being set to the predefined value if the corresponding portion of the cache line is not fully written with new data or if the corresponding portion of the cache line is fully written with new data in two or more write transactions; and

an eviction mechanism to evict data stored in one of the cache lines upon detecting validity bits indicating that respective portions of the cache line have been written with new write data that were not read from the main memory.